



RECEIVED

OCT 18 2002

## SUBSTITUTE SEQUENCE LISTING

TECH CENTER 1600/2900

<110> Bonnie L. Bassler  
Brendan N. Lilley

<120> LUXO-SIGMA54 INTERACTIONS AND METHODS OF  
USE

<130> PUNIV.002A

<140> 09/853,257

<141> 2001-05-10

<150> 60/202,999

<151> 2000-05-10

<160> 19

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 4003

<212> DNA

<213> Vibrio harveyi

<400> 1

agctcacggt	ctttcattgc	catacgggaa	ttccatatac	agcacatacg	caccagtgcg	60
ggatatggcac	tatcaggtgg	tgaacgccgc	cgtgtagaaa	ttgctcgtgc	attggcagca	120
aaccctcagt	tcattttggt	ggatgaaccg	ttcgcgggtg	ttgacccaat	ttcgggttaac	180
gacatcaaaa	aaatcatcga	acacttgccg	gatcgcgcc	ttggcgtgtt	aatcacagac	240
cataacgtac	gcgaaacctt	ggacgtttgt	gaaaaagcct	atatcgtaag	ccaaggacac	300
ctcatcgcat	cgggaactcc	ggatgaagtt	ctcaataacg	agcaagtga	acaagtttat	360
ctcggcgaa	aattccgtct	atgattacat	taggaacggt	aagattctga	gcattacaag	420
gtaagtaaca	ctgaatgaaa	ccttcattac	aactcaagct	aggtaaacag	ttagccatga	480
cgccacagct	gcagcaagcg	attcgtttgt	tgcaattgtc	gacgctcgat	cttcaacaag	540
aaatccaaga	agcgttggac	tccaaccgcg	tactggaagt	tgaagaaggc	cacgatgagc	600
ctcaagcaaa	tgggtgaagac	aaatcagcgt	ctgaatctgc	tgataaaagt	gcgaacgaag	660
ctaacgatgc	ctcagaacct	gaccttccag	atagctcaga	cgtgattgaa	aaatctgaaa	720
tcagctctga	gctagaaatt	gataccactt	gggatgacgt	atatagcgca	aacacgggca	780
gcacaggcct	agcgtgggat	gatgacatgc	ccgtctacca	aggtagagac	actgaatctt	840
tgcatgatta	ccttatgttg	cagttagact	taacgccttt	cagtgaacc	gaccgcacca	900
tcgccctcgc	gattatcgat	gcggtcgacg	actacggcta	cttaacccta	tcccctgaag	960
aaattcacga	gagcttcgac	aacgaagaag	tgggaattgga	tgaagtagaa	gcggtacgta	1020
agcgtattca	gcaatttgac	ccgctcgggtg	tagcctctcg	caatctgcaa	gaatgcctac	1080
tgctacaact	ggcaactttc	cctgaagaca	cgccgtggct	tgctgaggcg	aaaatgggtgt	1140
tgagcgatca	catcgaccac	cttggcaatc	gtgactacaa	gctggtcac	aaagaggcta	1200
agcttaaaga	agcggacttg	cgtgaagtat	tgaagttgat	tcaacaactt	gacccacgtc	1260
caggtagtcg	tatcacacct	gatgacactg	aatacgtcat	tccggatgtg	tccgtattta	1320
aagatcatgg	taagtggacc	gtctccataa	accctgacag	cattccgaaa	ctaaaagtaa	1380
atcaacaata	tgcgcaacta	ggcaaaggca	acagtgcgga	tagccagtac	attcgcagca	1440
atttgcaaga	ggcaaaatgg	ctgattaaga	gcctagaaag	cagaaacgag	acgcttctca	1500
aagttgcaag	atgtattggt	gaacatcaac	aagatttctt	cgagtatggg	gaagaagcca	1560
tgaaccaaat	ggtgctaacc	gacgtagcat	tggatgtgga	catgcatgaa	tcgacaattt	1620
ctcgtgtaac	aacacagaag	tttatgcata	ccccacgtgg	catttttgaa	ttgaagtact	1680
tcttctctag	cctgtgttagt	acagacaatg	gtggagagtg	ttcgtccaca	gcaattcgcg	1740
cactcatcaa	aaagttgggtc	gcagcggaga	ataccgctaa	gccactgagt	gatagcaaaa	1800

```

ttgctgctct tctggctgac caggggattc aagtcgagcg acggacgata gcaaaatata 1860
gtgaatcctt gggatttgcc ccttcgagtc agcgtaaacg cctacttttag gcaccaattg 1920
aaaaggaaaag tctatgcaaa tcaatattca aggccatcac gttgatctta ccgattcaat 1980
gcaagaatat gttgactcta agtttcaaaa gctcgagcgg ttcttcgacc acatcaatca 2040
agtccatgtc gtattaaaag ttgaaaaact taaccaaata gccgaagcta cgctccacat 2100
caatcaaggc gaaatccacg cgtcatcgaa cgacgaaagt atgtatgcag caattgattc 2160
gctgggtggat aaattagttc gtcaacttaa caagcacaaa gaaaaactaa acagtcatta 2220
atcatgcaat tgagcgaaat actgtcactg gactgcacca aaagtgcggg ccattgtaca 2280
agtaagaaac gtgccctcga aatgatcagc caaattgtcg ctgaaaacac gggccaagat 2340
tctacagaac tgtttgagtg tatgtcagc agagaaaaaaa tgggtagtac tggtatcggc 2400
aacggtattg ctatccctca cgcaagaatg caatcaagcg acaaagccat cgcagtgtta 2460
cttcagtgtg acgaagcaat tgaatttgac gctatcgaca accgacctgt cgaccttctt 2520
tttgctctcc ttgtacctga agaacagtgc aaagagcacc tcaaaacact atcctctatg 2580
gcagagcgtc taagtacaa gcaagtgtt aaaaagcttac gtaacgctca gacgatgaa 2640
gagctctacg acattatgat tcataagtaa tcaggacgat caccatgcga ttaatcggtg 2700
ttagcgggca ctctggtgcc gggaaaagt ttgccctgcg cgtacttgag gacttaggtt 2760
actactgctg agacaacctt ccggtaaaact tacttgacgc gtttgttcag tcagtctctg 2820
agagcaaaac aaatgtcgca gtaagcatcg atattcgaaa tatccctaag aagctcaaa 2880
aactgaatac cacgctagag aagctaaagg ctgaactgga tgtgacagta ctgttcttag 2940
acgcgaataa agaaacgctt ctcacccgct acagcgaaac acgtcggatt catccgctat 3000
cacttgacag tcaatcatta tcacttgatc aggcgattga gcttgaacaa gagatcttaa 3060
tgctcttgaa agcacacgca gacttagttc tgaacagtag cggccaatct ctgcatgatc 3120
tcagtgaac cgtagtatg cgtgtggaag gccgagaacg caaagactta gtcatgggtg 3180
ttgagtcgtt tggtttcaaa tacggtttac catcagatgc cgattacgtg tttgatgtgc 3240
gtttcttgcc aaaccacac tgggagccag cactgcgccc tctcactggg ttagatggcc 3300
cgatcggcgc cttcttagag caacaccagt cggtaactga tctgaaatac caaattgaaa 3360
gctttattga gacttggtta ccactattag agaaaaacaa ccgtagttac ctgaccgttg 3420
cgattgggtg tactgggtgg aaacaccgct cggtttatct tactcaaaaa attgggtgagt 3480
tctttgcgga caaaggacac caagtacaaa ttccgcacac ttcatggaa aagaacgtaa 3540
aggaataacg gtggaattaa gtcgtaaaag actgatccaa aaccgactag gcttgcacgc 3600
tcgtgcggca gttaaactgg tagaactagc acaaagcttc gacgcgggta ttaccatcga 3660
caacgaagaa gacaaaaccg cgaccgcaga cagcgtcatg ggattgctga tgctggaatc 3720
agcccaagga caatacgtga ccacccacgc cactggcgat caatctgagc aagctcttga 3780
tgcggtttgc catttgatcg aagataagtt tgacgaaggc gagtgattca ctgcgttttt 3840
tattatctct agccagatat cccacataag ttccacctcc tgcttaaatt ccgacaaata 3900
atthttgtcga ctttcataag ttgttattaa aaggtgccta gaattaagtt attattcaaa 3960
gcattgtaaa tatcaggaat tgggaggaat gaatggcaga gca 4003

```

<210> 2

<211> 491

<212> PRT

<213> *Vibrio harveyi*

<400> 2

```

Met Lys Pro Ser Leu Gln Leu Lys Leu Gly Gln Gln Leu Ala Met Thr
  1             5             10             15
Pro Gln Leu Gln Gln Ala Ile Arg Leu Leu Gln Leu Ser Thr Leu Asp
      20             25             30
Leu Gln Gln Glu Ile Gln Glu Ala Leu Asp Ser Asn Pro Leu Leu Glu
      35             40             45
Val Glu Glu Gly His Asp Glu Pro Gln Ala Asn Gly Glu Asp Lys Ser
      50             55             60
Ala Ser Glu Ser Ala Asp Lys Ser Ala Asn Glu Ala Asn Asp Ala Ser
      65             70             75             80
Glu Pro Asp Leu Pro Asp Ser Ser Asp Val Ile Glu Lys Ser Glu Ile
      85             90             95
Ser Ser Glu Leu Glu Ile Asp Thr Thr Trp Asp Asp Val Tyr Ser Ala

```

Asn	Thr	Gly	Ser	Thr	Gly	Leu	Ala	Leu	Asp	Asp	Asp	Met	Pro	Val	Tyr
115							120					125			
Gln	Gly	Glu	Thr	Thr	Glu	Ser	Leu	His	Asp	Tyr	Leu	Met	Trp	Gln	Leu
130							135					140			
Asp	Leu	Thr	Pro	Phe	Ser	Glu	Thr	Asp	Arg	Thr	Ile	Ala	Leu	Ala	Ile
145					150					155					160
Ile	Asp	Ala	Val	Asp	Asp	Tyr	Gly	Tyr	Leu	Thr	Leu	Ser	Pro	Glu	Glu
				165					170					175	
Ile	His	Glu	Ser	Phe	Asp	Asn	Glu	Glu	Val	Glu	Leu	Asp	Glu	Val	Glu
			180					185					190		
Ala	Val	Arg	Lys	Arg	Ile	Gln	Gln	Phe	Asp	Pro	Leu	Gly	Val	Ala	Ser
		195					200					205			
Arg	Asn	Leu	Gln	Glu	Cys	Leu	Leu	Gln	Leu	Ala	Thr	Phe	Pro	Glu	
	210					215					220				
Asp	Thr	Pro	Trp	Leu	Ala	Glu	Ala	Lys	Met	Val	Leu	Ser	Asp	His	Ile
225					230					235					240
Asp	His	Leu	Gly	Asn	Arg	Asp	Tyr	Lys	Leu	Val	Ile	Lys	Glu	Ala	Lys
				245					250					255	
Leu	Lys	Glu	Ala	Asp	Leu	Arg	Glu	Val	Leu	Lys	Leu	Ile	Gln	Gln	Leu
			260					265					270		
Asp	Pro	Arg	Pro	Gly	Ser	Arg	Ile	Thr	Pro	Asp	Asp	Thr	Glu	Tyr	Val
		275					280					285			
Ile	Pro	Asp	Val	Ser	Val	Phe	Lys	Asp	His	Gly	Lys	Trp	Thr	Val	Ser
	290					295					300				
Ile	Asn	Pro	Asp	Ser	Ile	Pro	Lys	Leu	Lys	Val	Asn	Gln	Gln	Tyr	Ala
305					310					315					320
Gln	Leu	Gly	Lys	Gly	Asn	Ser	Ala	Asp	Ser	Gln	Tyr	Ile	Arg	Ser	Asn
				325					330					335	
Leu	Gln	Glu	Ala	Lys	Trp	Leu	Ile	Lys	Ser	Leu	Glu	Ser	Arg	Asn	Glu
			340					345					350		
Thr	Leu	Leu	Lys	Val	Ala	Arg	Cys	Ile	Val	Glu	His	Gln	Gln	Asp	Phe
		355					360					365			
Phe	Glu	Tyr	Gly	Glu	Glu	Ala	Met	Lys	Pro	Met	Val	Leu	Asn	Asp	Val
	370					375					380				
Ala	Leu	Asp	Val	Asp	Met	His	Glu	Ser	Thr	Ile	Ser	Arg	Val	Thr	Thr
385					390					395					400
Gln	Lys	Phe	Met	His	Thr	Pro	Arg	Gly	Ile	Phe	Glu	Leu	Lys	Tyr	Phe
				405					410					415	
Phe	Ser	Ser	His	Val	Ser	Thr	Asp	Asn	Gly	Gly	Glu	Cys	Ser	Ser	Thr
		420						425					430		
Ala	Ile	Arg	Ala	Leu	Ile	Lys	Lys	Leu	Val	Ala	Ala	Glu	Asn	Thr	Ala
		435					440					445			
Lys	Pro	Leu	Ser	Asp	Ser	Lys	Ile	Ala	Ala	Leu	Leu	Ala	Asp	Gln	Gly
	450					455					460				
Ile	Gln	Val	Ala	Arg	Arg	Thr	Ile	Ala	Lys	Tyr	Arg	Glu	Ser	Leu	Gly
465					470					475					480
Ile	Ala	Pro	Ser	Ser	Gln	Arg	Lys	Arg	Leu	Leu					
				485					490						

<210> 3

<211> 476

<212> DNA

<213> Vibrio harveyi

<400> 3

```

atgaaacctt cattacaact caagctaggt caacagttag ccatgacgcc acagctgcag 60
caagcgattc gtttggtgca attgtcgacg ctcgatcttc aacaagaaat ccaagaagcg 120
ttggactcca acccgctact ggaagttgaa gaaggccacg atgagcctca agcaaattgg 180
gaagacaaat cagcgtctga atctgctgat aaaagtgcga acgaagctaa cgatgcctca 240
gaacccgacc ttccagatag ctccagacgtg attgaaaaat ctgaaatcag ctctgagcta 300
gaaattgata ccacttgga tgacgtatat agcgcaaaca cgggcagcac aggcctagcg 360
ctggatgatg acatgcccgt ctaccaaggt gagaccactg aatctttgca tgattacctt 420
atgtggcagt tagacttaac gcctttcagt gaaaccgacc gcaccatcgc cctcgc 476

```

<210> 4

<211> 6

<212> PRT

<213> Artificial Sequence

<220>

<223> portion of consensus sequence of sigma-54 domains

<221> VARIANT

<222> (1)...(6)

<223> Xaa = Trp or Phe

<400> 4

Xaa Phe Pro Gly Asn Val

1

5

<210> 5

<211> 6

<212> PRT

<213> Artificial Sequence

<220>

<223> portion of consensus sequence of sigma-54 domains

<221> VARIANT

<222> (1)...(6)

<223> Xaa = Val, Ala, Asp, Glu, Gly

<400> 5

Glu Leu Phe Gly His Xaa

1

5

<210> 6

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> upstream primer to amplify rpoN gene

<400> 6

ggycaacart tagcsatgac

20

<210> 7

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> downstream primer to amplify rpoN gene

<400> 7

catgcytcy tcwccatact c

21

<210> 8

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> upstream primer used to amplify rpoN gene

<400> 8

ggaacggtag aattctgagc attac

25

<210> 9

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> downstream primer used to amplify rpoN gene

<400> 9

ccttttgaat tcgtgcctaa agtaggcg

28

<210> 10

<211> 222

<212> PRT

<213> V. harveyi

<400> 10

Ile	Gly	Ser	Ser	Gln	Thr	Met	Gln	Gln	Val	Tyr	Arg	Thr	Ile	Asp	Ser
1				5					10					15	
Ala	Ala	Ser	Ser	Lys	Ala	Ser	Ile	Phe	Ile	Thr	Gly	Glu	Ser	Gly	Thr
			20					25					30		
Gly	Lys	Glu	Val	Cys	Ala	Glu	Ala	Ile	His	Ala	Ala	Ser	Lys	Arg	Gly
		35					40						45		
Asp	Lys	Pro	Phe	Ile	Ala	Ile	Asn	Cys	Ala	Ala	Ile	Pro	Lys	Asp	Leu
		50				55					60				
Ile	Glu	Ser	Glu	Leu	Phe	Gly	His	Val	Lys	Gly	Ala	Phe	Thr	Gly	Ala
65					70					75				80	
Ala	Asn	Asp	Arg	Gln	Gly	Ala	Ala	Glu	Leu	Ala	Asp	Gly	Gly	Thr	Leu
				85					90					95	
Phe	Leu	Asp	Glu	Leu	Cys	Glu	Met	Asp	Leu	Asp	Leu	Gln	Thr	Lys	Leu
			100					105					110		
Leu	Arg	Phe	Ile	Gln	Thr	Gly	Thr	Phe	Gln	Lys	Val	Gly	Ser	Ser	Lys
		115				120						125			
Met	Lys	Ser	Val	Asp	Val	Arg	Phe	Val	Cys	Ala	Thr	Asn	Arg	Asp	Pro
		130				135					140				
Trp	Lys	Glu	Val	Gln	Glu	Gly	Arg	Phe	Arg	Glu	Asp	Leu	Tyr	Tyr	Arg
145					150					155				160	
Leu	Tyr	Val	Ile	Pro	Leu	His	Leu	Pro	Pro	Leu	Arg	Glu	Arg	Gly	Lys

				165				170					175				
Asp	Val	Ile	Glu	Ile	Ala	Tyr	Ser	Leu	Leu	Gly	Tyr	Met	Ser	His	Glu		
			180					185					190				
Glu	Gly	Lys	Ser	Phe	Val	Arg	Phe	Ala	Gln	Asp	Val	Ile	Glu	Arg	Phe		
		195					200					205					
Asn	Ser	Tyr	Glu	Trp	Pro	Gly	Asn	Val	Arg	Gln	Leu	Gln	Asn				
	210					215					220						

<210> 11  
 <211> 222  
 <212> PRT  
 <213> S. typhimurium

<400> 11																	
Ile	Gly	Glu	Ala	Pro	Ala	Met	Gln	Asp	Leu	Phe	Arg	Ile	Ile	Gly	Arg		
1				5					10					15			
Leu	Ser	Arg	Ser	Ser	Ile	Ser	Val	Leu	Ile	Asn	Gly	Glu	Ser	Gly	Thr		
			20					25				30					
Gly	Lys	Glu	Leu	Val	Ala	His	Ala	Leu	His	Arg	His	Ser	Pro	Arg	Ala		
	35						40					45					
Lys	Ala	Pro	Phe	Ile	Ala	Leu	Asn	Met	Ala	Ala	Ile	Pro	Lys	Asp	Leu		
	50					55					60						
Ile	Glu	Ser	Glu	Leu	Phe	Gly	His	Glu	Lys	Gly	Ala	Phe	Thr	Gly	Ala		
65					70					75					80		
Asn	Thr	Ile	Arg	Gln	Gly	Arg	Phe	Glu	Gln	Ala	Asp	Gly	Gly	Thr	Leu		
			85					90						95			
Phe	Leu	Asp	Glu	Ile	Gly	Asp	Met	Pro	Leu	Asp	Val	Gln	Thr	Arg	Leu		
		100						105						110			
Leu	Arg	Val	Leu	Ala	Asp	Gly	Gln	Phe	Tyr	Arg	Val	Gly	Gly	Tyr	Ala		
	115						120					125					
Pro	Val	Lys	Val	Asp	Val	Arg	Ile	Ile	Ala	Ala	Thr	His	Gln	Asn	Leu		
	130					135					140						
Glu	Arg	Arg	Val	Gln	Glu	Gly	Lys	Phe	Arg	Glu	Asp	Leu	Phe	His	Arg		
145				150						155					160		
Leu	Asn	Val	Ile	Arg	Ile	His	Leu	Pro	Pro	Leu	Arg	Glu	Arg	Arg	Glu		
			165					170						175			
Asp	Ile	Pro	Arg	Leu	Ala	Arg	His	Phe	Leu	Gln	Val	Ala	Ala	Arg	Glu		
		180						185						190			
Leu	Gly	Val	Glu	Ala	Lys	Leu	Leu	His	Pro	Glu	Thr	Glu	Thr	Ala	Leu		
	195						200					205					
Thr	Arg	Leu	Ala	Trp	Pro	Gly	Asn	Val	Arg	Gln	Leu	Glu	Asn				
	210					215					220						

<210> 12  
 <211> 221  
 <212> PRT  
 <213> K pneumoniae

<400> 12																	
Val	Gly	Lys	Ser	Pro	Ala	Met	Arg	Gln	Ile	Met	Asp	Ile	Ile	Arg	Gln		
1				5					10					15			
Val	Ser	Arg	Trp	Asp	Thr	Thr	Val	Leu	Val	Arg	Gly	Glu	Ser	Gly	Thr		
			20					25				30					
Gly	Lys	Glu	Leu	Ile	Ala	Asn	Ala	Ile	His	His	Asn	Ser	Pro	Arg	Ala		
	35						40					45					

Ala	Ala	Ala	Phe	Val	Lys	Phe	Asn	Cys	Ala	Ala	Leu	Pro	Asp	Asn	Leu
50						55					60				
Leu	Glu	Ser	Glu	Leu	Phe	Gly	His	Glu	Lys	Gly	Ala	Phe	Thr	Gly	Ala
65					70					75					80
Val	Arg	Gln	Arg	Lys	Gly	Arg	Phe	Glu	Leu	Ala	Asp	Gly	Gly	Thr	Leu
				85					90					95	
Phe	Leu	Asp	Glu	Ile	Gly	Glu	Ser	Ser	Ala	Ser	Phe	Gln	Ala	Lys	Leu
			100					105					110		
Leu	Arg	Ile	Leu	Gln	Glu	Gly	Glu	Met	Glu	Arg	Val	Gly	Gly	Asp	Glu
		115					120					125			
Thr	Leu	Arg	Val	Asn	Val	Arg	Ile	Ile	Ala	Ala	Thr	Asn	Arg	His	Leu
	130					135						140			
Glu	Glu	Glu	Val	Arg	Leu	Gly	His	Phe	Arg	Glu	Asp	Leu	Tyr	Tyr	Arg
145					150					155					160
Leu	Asn	Val	Met	Pro	Ile	Ala	Leu	Pro	Pro	Leu	Arg	Glu	Arg	Gln	Glu
				165					170					175	
Asp	Ile	Ala	Glu	Leu	Ala	His	Phe	Leu	Val	Arg	Lys	Ile	Ala	His	Ser
			180					185					190		
Gln	Gly	Arg	Thr	Leu	Arg	Ile	Ser	Asp	Gly	Ala	Ile	Arg	Leu	Leu	Met
		195					200					205			
Glu	Tyr	Ser	Trp	Pro	Gly	Asn	Val	Arg	Glu	Leu	Glu	Asn			
	210					215					220				

<210> 13

<211> 222

<212> PRT

<213> R. leguminosarum

<400> 13

Ile	Gly	Gln	Thr	Pro	Val	Met	Glu	Asn	Leu	Arg	Asn	Ile	Leu	Arg	His
1				5					10					15	
Ile	Ala	Asp	Thr	Asp	Val	Asp	Val	Leu	Val	Ala	Gly	Glu	Thr	Gly	Ser
		20						25					30		
Gly	Lys	Glu	Val	Val	Ala	Gln	Ile	Leu	His	Gln	Trp	Ser	His	Arg	Arg
		35				40						45			
Lys	Gly	Asn	Phe	Val	Ala	Leu	Asn	Cys	Gly	Ala	Leu	Pro	Glu	Thr	Val
	50					55					60				
Ile	Glu	Ser	Glu	Leu	Phe	Gly	His	Glu	Arg	Gly	Ala	Phe	Thr	Gly	Ala
65					70					75					80
Gln	Lys	Arg	Arg	Thr	Gly	Arg	Ile	Glu	His	Ala	Ser	Gly	Gly	Thr	Leu
			85						90					95	
Phe	Leu	Asp	Glu	Ile	Glu	Ser	Met	Pro	Ala	Ala	Thr	Gln	Val	Lys	Met
			100					105					110		
Leu	Arg	Val	Leu	Glu	Met	Arg	Glu	Ile	Thr	Pro	Leu	Gly	Thr	Asn	Glu
		115					120					125			
Val	Arg	Pro	Val	Asn	Leu	Arg	Val	Val	Ala	Ala	Ala	Lys	Ile	Asp	Leu
		130				135					140				
Gly	Asp	Pro	Ala	Val	Arg	Gly	Asp	Phe	Arg	Glu	Asp	Leu	Tyr	Tyr	Arg
145					150					155					160
Leu	Asn	Val	Val	Thr	Ile	Ser	Ile	Pro	Pro	Leu	Arg	Glu	Arg	Arg	Asp
			165					170					175		
Asp	Ile	Pro	Leu	Leu	Phe	Ser	His	Phe	Ala	Ala	Arg	Ala	Ala	Glu	Arg
		180						185					190		
Phe	Arg	Arg	Asp	Val	Pro	Pro	Leu	Ser	Pro	Asp	Val	Arg	Arg	His	Leu
		195					200					205			
Ala	Ser	His	Thr	Trp	Pro	Gly	Asn	Val	Arg	Glu	Leu	Ser	His		

210

215

220

<210> 14  
 <211> 219  
 <212> PRT  
 <213> E. coli

<400> 14

Val	Gly	Lys	Ser	Pro	Ala	Met	Gln	His	Leu	Leu	Ser	Glu	Ile	Ala	Leu
1				5					10					15	
Val	Ala	Pro	Cys	Glu	Ala	Thr	Val	Leu	Ile	His	Gly	Asp	Ser	Ala	Arg
			20					25					30		
Lys	Glu	Leu	Val	Ala	Arg	Gly	Leu	His	Ala	Ser	Ser	Ala	Arg	Ser	Glu
		35					40					45			
Lys	Pro	Leu	Val	Thr	Leu	Asn	Cys	Ala	Ala	Leu	Asn	Glu	Ser	Leu	Leu
		50				55					60				
Glu	Ser	Glu	Leu	Phe	Gly	His	Glu	Lys	Gly	Ala	Phe	Thr	Gly	Ala	Asp
65					70					75					80
Lys	Arg	Arg	Glu	Gly	Pro	Phe	Val	Glu	Ala	Asp	Gly	Gly	Thr	Cys	Leu
				85					90					95	
Asp	Glu	Ile	Gly	Asp	Ile	Ser	Pro	Met	Met	Gln	Val	Arg	Leu	Leu	Arg
			100					105					110		
Ala	Ile	Gln	Glu	Arg	Glu	Val	Gln	Arg	Val	Gly	Ser	Asn	Gln	Ile	Ile
		115					120					125			
Ser	Val	Asp	Val	Arg	Leu	Ile	Ala	Ala	Thr	His	Arg	Asp	Leu	Ala	Ala
		130					135					140			
Glu	Val	Asn	Ala	Gly	Arg	Phe	Arg	Gln	Asp	Leu	Tyr	Tyr	Arg	Leu	Asn
145					150					155					160
Val	Val	Ala	Ile	Glu	Val	Pro	Ser	Leu	Arg	Gln	Arg	Arg	Glu	Asp	Ile
				165					170					175	
Pro	Leu	Leu	Ala	Gly	His	Phe	Leu	Gln	Arg	Phe	Ala	Glu	Arg	Asn	Arg
			180					185					190		
Arg	Gly	Lys	Arg	Phe	Tyr	Ala	Pro	Gly	Leu	Asp	Leu	Leu	Ile	His	Tyr
		195					200					205			
Asp	Trp	Pro	Gly	Asn	Ile	Arg	Glu	Leu	Glu	Asn					
		210					215								

<210> 15  
 <211> 222  
 <212> PRT  
 <213> C. crescentus

<400> 15

Val	Val	Arg	Asp	Pro	Ala	Met	Glu	Gln	Val	Ile	Lys	Leu	Ala	Asp	Gln
1				5					10					15	
Val	Ala	Pro	Ser	Glu	Ala	Ser	Ile	Leu	Ile	Thr	Gly	Glu	Ser	Gly	Ser
			20					25					30		
Gly	Lys	Glu	Val	Met	Ala	Arg	Tyr	Val	His	Gly	Lys	Ser	Arg	Arg	Ala
		35					40					45			
Lys	Ala	Pro	Phe	Ile	Ser	Val	Asn	Cys	Ala	Ala	Ile	Pro	Glu	Asn	Leu
		50				55					60				
Leu	Glu	Ser	Glu	Leu	Phe	Gly	His	Glu	Lys	Gly	Ala	Phe	Thr	Gly	Ala
65					70					75					80
Met	Ala	Arg	Arg	Ile	Gly	Lys	Phe	Glu	Glu	Ala	Asp	Gly	Gly	Thr	Leu
				85					90					95	





<213> C. crescentus

<400> 19

Gly	Asn	Arg	Thr	His	Ala	Ala	Asn	Ile	Leu	Gly	Ile	Ser	Ile	Arg	Thr
1				5					10					15	
Leu	Arg	Asn	Lys	Leu	Lys	Glu	Tyr	Ser	Asp	Ala					
			20					25							